PATENT ABSTRACTS OF JAPAN

(11)Publication number : 11-349708

(43)Date of publication of application : 21.12.1999

(51)Int.Cl. C08J 5/18
B32B 27/36
B65D 53/00
B65D 77/20
// C09J 7/02
C09J167/02
C08L 67:02

(21)Application number : 10-159002

(22)Date of filing : 08.06.1998

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(54) EASY-PEEL SEALING MATERIAL AND LID MATERIAL

(57)Abstract:

PROBLEM TO BE SOLVED: To produce an easy-peel sealing material enabling the heat-sealing of a plastic plate and plastic vessel at a low temperature and having excellent retort resistance by using a crystalline polyester having respectively specific glass transition temperature and melting point.

SOLUTION: The objective material is composed of a polyester resin composition composed mainly of a crystalline polyester having a glass transition temperature of ≤0°C and a melting point of 120-200°C. The composition is preferably composed of (A) 97-80 wt.% of the crystalline polyester and (B) 3-20 wt.% of a polyolefin resin (e.g. polyethylene). The composition may be incorporated with an additive, e.g. a slipping agent such as silica.

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[Date of request for examination]

[Date of sending the examiner's decision of rejection]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention carries out the laminating of the easy PIRU sealant and this sealant for easy PIRU which could remove easily [the sealant for easy PIRU especially a plastic sheet or a plastic envelope, and when / though heat sealing at low temperature is possible, / tearing off], and were especially excellent in retort-proof nature between the crystallization polyethylene terephthalate (it may be written as C-PET below) plate, or the C-PET container, and the base material, is obtained, and relates to the lid material for heat sealing with a plastic sheet or a plastic envelope.
[0002]
[Description of the Prior Art] or [including sheets plastic, such as polypropylene, polyethylene terephthalate, polystyrene, a polycarbonate, and a polyvinyl chloride, / carrying out heat molding] -- or the shape of a tray and cup-like molding object acquired by carrying out injection molding is widely used as a container of food or a drink article. When carrying out the seal package of the contents generally at such a plastic envelope, a container is filled up with contents, and lid material and a plastic envelope are heat sealed and sealed after that. Since a plastic envelope may deform that heat-sealing temperature is an elevated temperature in that case, or the heat-sealing section may be pressing hard and leakage of contents may take place, the sealant which can be heat sealed at low temperature is called for. Moreover, since it is difficult to exfoliate lid material by hand if seal reinforcement is too strong, it will be necessary to clear lid material. That is, it is required to keep moderate seal reinforcement as a sealant possible [the seal in low temperature]. As for seal reinforcement, specifically, it is desirable that they are 1-2kgf / 15mm.
[0003] Although polyolefines including polypropylene had been conventionally used abundantly as plastics used for a food container, in order to adsorb the aroma component of food, the taste and aroma of food may change, and an odor peculiar to polyolefine may be generated, and there was a trouble that the flavor of food original was lost. So, recently, in order to improve this point, there is a motion which is going to use the food container which consists of the so-called good plastics of flavor nature like polyethylene terephthalate.
[0004] Moreover, recently, performing elevated-temperature restoration, elevated-temperature voile, and retorting for the purpose of the ordinary temperature mothball of food is increasing, and what has thermal resistance also about a container is called for. C-PET can be equal also to retort sterilization processing, and attracts attention as a material which was moreover excellent also in flavor nature. However, even if the adhesive property was bad since C-PET did not soften at all at low temperature, and it raised seal temperature to near the melting point of C-PET, even if it was going to heat seal in the C-PET container by the sealant known until now, and heat sealed, it was not the object which a plastic envelope deforms and is equal to practical use. Moreover, when own thermal resistance of a sealing layer was insufficient, there was also a problem that milkiness, deformation, leakage of contents, etc. occurred, at the time of retort sterilization. Therefore, although the method of inserting in the lid material cast so that a container might be suited, being crowded, or putting the container itself in a bag

and circulating was used, since the retort sterilization after being filled up with contents was impossible, the actual condition had seldom spread.
[0005] Although it has proposed using the resin constituent which blended polyethylene terephthalate system resin, polybutylene terephthalate system resin, and polyolefine system resin as a sealant of a polyester system container by JP,60-180833,A as old invention as a sealant for lids, it is indicated that it will be hard to heat seal too if the polyethylene terephthalate of a container is not non-orientation (amorphism). Moreover, in JP,4-18268,A, it was the object which is hard to put in practical use even if it thinks from the field of engine performance like retort-proof nature also from a cost side although the sealant of applying at a part called [one side / whole surface] the shape for example, of a mesh to a it top in another side using two kinds of polyester system resin is proposed. Furthermore, although the lid material which blended polyethylene system resin in polyester and was excellent in easy PIRU nature is proposed in JP,59-59444,A, flavor nature is not good in order to use polyethylene resin so much. Moreover, even if it was going to carry out the seal to C-PET using the resin (high Tg amorphia) shown in the example, a seal was not able to be carried out at all.
[0006]
[Problem(s) to be Solved by the Invention] By solving the trouble which the above-mentioned conventional easy PIRU sealant has, and using the crystalline polyester which has a specific glass transition temperature and the specific melting point, to the difficult C-PET plate or a C-PET container, heat sealing at low temperature is possible, and this invention even aims heat sealing a plastic sheet and a plastic envelope, especially until now at offering the sealant and lid material which were moreover excellent in retort-proof nature and easy PIRU nature.
[0007]
[Means for Solving the Problem] In order to attain the above-mentioned purpose, the easy PIRU sealant of this invention is characterized by consisting of a polyester resin constituent with which glass transition temperature uses as a principal component the crystalline polyester 0 degree C or less and whose melting point are 120-200 degrees C.
[0008] The easy PIRU sealant of this invention which consists of the above-mentioned configuration is excellent in low-temperature heat-sealing nature, retort-proof nature, and easy PIRU nature.
[0009] In this case, the above-mentioned polyester resin constituent can be a resin constituent which consists of 97 - 80 % of the weight of crystalline polyester, and 3 - 20 % of the weight of polyolefine system resin.
[0010] Moreover, the easy PIRU lid material of this invention is characterized by carrying out the laminating of the above-mentioned easy PIRU sealant to a base material.
[0011] While the easy PIRU lid material of this invention which consists of the above-mentioned configuration has the outstanding reinforcement, low-temperature heat-sealing nature, retort-proof nature, and easy PIRU nature are excellent.
[0012] In this case, the above-mentioned easy PIRU lid material can be heat sealed by the polyester product.
[0013] Moreover, the above-mentioned polyester can be crystallization polyethylene terephthalate (C-PET) in this case.
[0014]
[Embodiment of the Invention] The gestalt of operation of the easy PIRU sealant of this invention and lid material is explained to a detail.
[0015] 0 degree C or less of glass transition temperature of the crystalline polyester which is the principal component of the polyester resin constituent used in this invention is -5 degrees C or less desirably. If glass transition temperature exceeds 0 degree C, the volumetric shrinkage at the time of crystallization of crystalline polyester will be large, and the adhesive property to crystallization polyethylene terephthalate will fall remarkably.
[0016] As for the melting point of the crystalline polyester used for the easy PIRU sealant of this invention, it is desirable that it is 120-200 degrees C, and is 120-180 degrees C. If seal reinforcement falls remarkably and exceeds 200 degrees C while milkiness and deformation of a glue line take place

that the melting point is less than 120 degrees C at the time of a retort and an appearance worsens, it will be necessary to make seal temperature high, and it becomes a poor appearance in order that C-PET may soften and deform. As for the reduced viscosity (etasp/c) of crystalline polyester, it is desirable that it is usually 0.5 to about 2.0 from the point of a film moldability.

[0017] As a multiple-valued carboxylic-acid component which constitutes the crystalline polyester used for the easy PIRU sealant of this invention, well-known things, such as a terephthalic acid, isophthalic acid, an orthochromatic phthalic acid, naphthalene dicarboxylic acid, a succinic acid, an adipic acid, an azelaic acid, a sebacic acid, a decanoic acid, dimer acid, cyclohexane dicarboxylic acid, and trimellitic acid, can be used. Moreover, as a polyhydric-alcohol component, ethylene glycol, propylene glycol, butanediol, 2-methyl-1,3-propanediol, pentanediol, 3-methyl pentanediol, hexandiol, nonane diol, cyclohexane dimethanol, a polyethylene glycol, a polypropylene glycol, a polytetramethylene glycol, trimethylol propane, etc. can be used.

[0018] Moreover, although the principal component of the polyester resin constituent used for the easy PIRU sealant of this invention is crystalline polyester, various additives can be added further if needed. For example, as a slipping agent, a silica, talc, a mica, a calcium carbonate, etc. are stearin acid monoglyceride, a sorbitan acid polyoxyethylene, etc. as antistatic agents. Moreover, a part of polyolefine system resin, polyamide, polycarbonate, etc. can be contained in the range which does not change the property a lot.

[0019] In order to adjust the heat-sealing reinforcement of an easy PIRU sealant moderately and to make easy PIRU nature good especially, polyolefine system resin can also be made to contain in addition to the crystalline polyester of a principal component. When blending polyolefine system resin in the crystalline polyester used in this invention, it is 8 - 20 % of the weight desirably three to 20% of the weight. An easy PIRU sealant is obtained by adjusting peel strength to 1-2kgf / 15mm by combination of above-mentioned within the limits. When actually exfoliating by hand, in order to obtain the especially excellent easy PIRU nature of exfoliation, i.e., a good feeling, it is desirable to blend polyolefine system resin 3% of the weight or more. However, since seal reinforcement tends to become weak and is further inferior to flavor nature when the amount of blends exceeds 20 % of the weight, the problem of adsorption of the contents component of a resin smell or a container arises. As polyolefine system resin to add, polyethylene, polypropylene, polybutene, the Polly 4-methyl pentene -1, an ionomer, ethylene propylene rubber, an ethylene butene copolymer, a propylene butene copolymer, etc. can be used.

[0020] As an approach of measuring the seal reinforcement of the easy PIRU sealant used for this invention, it is carried out using the following approaches. After sticking together with C-PET (Cby Toyobo Co., Ltd. 5605Z1R) which performed 500-micrometer crystallization processing after carrying out the laminating of the sealant layer on the corona-discharge-treatment side of 50-micrometer biaxial extension polyethylene terephthalate film (Toyobo Co., Ltd. make E1501) on the conditions for 140 (heat-sealing circuit tester TP[by the circuit tester industrial company]-701-B) degree-Cx2 kgf/cm2x 2 seconds, a hauling testing machine performs T mold exfoliation at the rate of 300 mm/min. the value by which easy PIRU nature is made good as seal reinforcement at this time -- 1-2kgf/-- they are 1.3-1.8kgf / the range of 15mm desirably 15mm. If this seal reinforcement exceeds 2kgf(s) / 15mm, it will be hard coming to open especially in weak people and child, and it will be necessary to clear with a knife etc. Moreover, depending on the case, the biaxial extension polyethylene terephthalate film itself which is a base material may be destroyed, and a lid may be torn. There is a possibility that a lid may, on the other hand, open carelessly that seal reinforcement is 1kgf / less than 15mm by the rise of the internal pressure at the time of a retort or vibration under transportation.

[0021] On **s, such as metallic foils, such as a base material, for example, plastic film like a polyethylene terephthalate film, and aluminum, or paper, direct melting extrusion of the easy PIRU sealant which uses the crystalline polyester of this invention as a principal component can be carried out, it can also be made into a layered product, and after it produces beforehand the crystalline polyester used for the easy PIRU sealant of this invention on a film, the laminating of it can also be carried out to the above-mentioned base material using another, suitable well-known adhesives.

[0022] Although the layered product containing the easy PIRU sealant of this invention can also be used for common heat sealing, it is the the best for easy PIRU lid material for polyester products, such as a plastic sheet or a plastic envelope, to heat seal especially. It is especially the optimal as lid material for the seals of polyester, the C-PET plate which was difficult the seal in the former, or a C-PET container. Although the thickness of the easy PIRU sealant of this invention can be set to arbitration by the application, it is usually 3 50 - mum grade. Moreover, although the thickness of lid material can also be set to arbitration by the application, it is usually about 20-150 micrometers.
[0023] With in addition, the crystallization polyethylene terephthalate (C-PET) used by this invention Everything but Perilla frutescens (L.) Britton var. crispa (Thunb.) Decne. a terephthalic acid a part as a principal component as a multiple-valued carboxylic-acid component Isophthalic acid, An orthochromatic phthalic acid, naphthalene dicarboxylic acid, a succinic acid, an adipic acid, An azelaic acid, a sebacic acid, a decanoic acid, dimer acid, cyclohexane dicarboxylic acid, Trimellitic acid etc. can be included as occasion demands, and ethylene glycol is used as a principal component as a polyhydric-alcohol component. A part In addition, propylene glycol, butanediol, 2-methyl-1,3-propanediol, Pentanediol, 3-methyl pentanediol, hexandiol, Nonane diol, cyclohexane dimethanol, a polyethylene glycol, a polypropylene glycol, a polytetramethylene glycol, trimethylol propane, etc. can be included as occasion demands. Furthermore, crystalline-nucleus material can be blended with C-PET if needed, for example, the organic substance, such as inorganic substances, such as talc and a mica, or polyolefine, and a polyamide, is mentioned.
[0024]
[Example] Although an example is given to below in order to explain this invention to a detail further, this invention is not limited at all by the example. In addition, the measured value indicated by the example is measured by the following approach.
[0025] Glass transition temperature, the melting point: It measured with the programming rate of 20 degrees C / min with the DSCby SEIKO electronic industry incorporated company220 mold. 10mg of test portions was paid to the aluminum pan, and the lid was pressed down, sealed and measured.
[0026] Seal reinforcement: The laminating of the 40-micrometer sealant layer was carried out on the 50-micrometer biaxial stretching PET, and after doubling with C-PET which subsequently performed 300-micrometer crystallization processing, it heat sealed using the heat-sealing circuit tester by the circuit tester industrial company. In addition, heat sealing was performed in the temperature of 140 degrees C, pressure 2 kgf/cm2, and time amount 2 seconds. Seal reinforcement measured T mold exfoliation adhesive strength at the hauling rate in 300 mm/min using the Oriental Baldwin RTM-100 hauling testing machine. Seal on-the-strength 1-2kgf / 15mm thing was judged to be fitness, and the other thing was judged to be poor.
[0027] Retort trial: After performing retorting for [120 degree-Cx] 30 minutes, appearance change (deformation, milkiness) of a sealing layer was checked.
[0028] Reduced viscosity: Polyester 0.1g was dissolved in 25 cc of phenol NOTETORA chloroethane (weight ratios 6/4) mixed solvents, and it measured at 30 degrees C using the ubellohde's viscosimeter.
[0029] The terephthalic-acid 2590 weight section, the sebacic-acid 2790 weight section, the butanediol 5290 weight section, and the tetrabuthyl titanate 7 weight section were added in the reaction can which equipped the example agitator of manufacture of crystalline polyester (I), the thermometer, and the ****** condensator, and the esterification reaction was performed at 170-220 degrees C for 2 hours. After esterification reaction termination, while carrying out the temperature up of the system of reaction from 220 degrees C to 255 degrees C, the inside of a system was slowly made reduced pressure, and it was referred to as 5Torr(s) at 255 degrees C over 60 minutes. And the polycondensation reaction was performed for 55 minutes by 1 more or less Torr, and crystalline white polyester (I) was obtained.
[0030] As for crystalline polyester (I), in the dicarboxylic acid component, the 53 mol % and 47 mol [of sebacic acids] % and diol component of terephthalic acids had butanediol 100 mol% of presentation as a result of NMR analysis. Moreover, glass transition temperature was -36 degrees C, and the melting point was crystalline polymer of 122 degrees C and reduced viscosity (etasp/c) =120.
[0031] Crystallization polyester (II) - (IV) were compounded by the same approach as crystalline

polyester (I). Each value is shown in Table 1 (a numeric value is mol% in resin).
[0032] The combination in Table 2 is a weight ratio (%). In addition, as an ionomer, Sumitomo Chemical Co., Ltd. no BUREN W101 was used as Mitsui and the high milan 1650 by DEYUPON poly chemical incorporated company, and polypropylene. Kneading was performed using the 30mm[by Ikegai Corp.] phi 2 shaft kneading machine, and after pelletizing, the evaluation sample was obtained by extruding and laminating to up to the base material which consists of a 50-micrometer biaxial extension PET film using 40mm[by NSK place incorporated company] phi monopodium extruder. The polyester independent thing performed the direct extrusion lamination.
[0033]
[Table 1]

結晶性ポリエステル	I	II	III	IV
テレフタル酸	53	65	57	50
イソフタル酸		35	43	
セバシン酸	47			50
ブタンジオール	100	83	100	88
エチレングリコール				12
ポリテトラメチレングリコール		17		
還元粘度(ηsp/c)	1.20	1.85	0.83	1.01
ガラス転移温度 (℃)	−36	−70	25	−32
融点 (℃)	122	123	143	111

(各化合物の量は重量%を示す)

[0034]
[Table 2]

	実施例				比較例			
	1	2	3	4	1	2	3	4
ポリエステル (I)	100		85				70	
ポリエステル (II)		100		95				
ポリエステル (III)					100			
ポリエステル (IV)						100		88
アイオノマー				5				
ポリプロピレン			15				30	12
シール強度 (kgf/15mm)	2.0	1.9	1.2	1.5	0	1.9	0.5	1.4
レトルト性 (白化)	○	○	○	○	○	×	○	×
レトルト性 (変形)	○	○	○	○	○	×	○	×

(各重合体の量は重量%を示す)

[0035]
[Effect of the Invention] According to the easy PIRU sealant of this invention, low-temperature heat-sealing nature, retort-proof nature, and easy PIRU nature are excellent. Moreover, while easy PIRU lid

material has the outstanding reinforcement, low-temperature heat-sealing nature, retort-proof nature, and easy PIRU nature are excellent.

[Translation done.]